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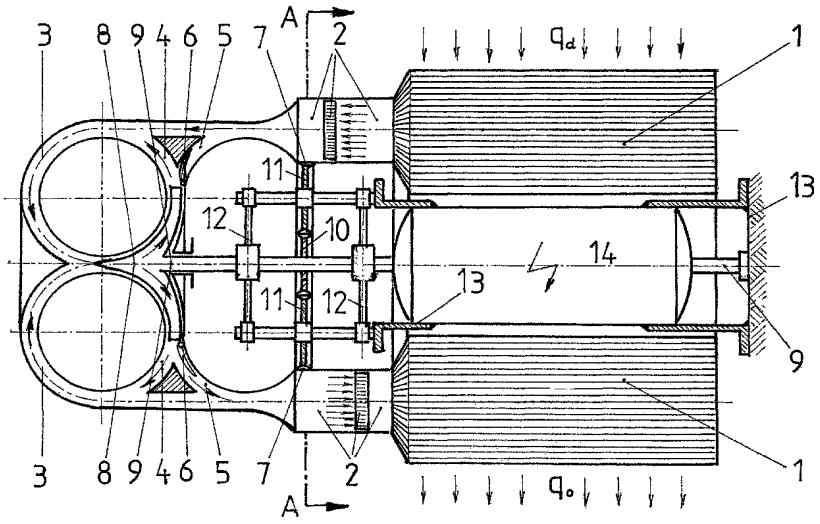
(54) **Title:** THERMAL HYDRO-MACHINE ON HOT GAS WITH RECIRCULATION




(57) **Abstract:** The thermal hydro-machine on hot gas with recirculation (Figures 3, 4 and 5) belongs to the group of multi-cylinder piston rotational machines for converting the heat into the mechanical work. The heat is conducted to on the outer side of one part of rotational tubular heat exchanger (1) and is simultaneously conducted away from the other part of same exchanger (1). The exchanger is composed of a set of independent segment collectors (1) arranged in the form of a cylindrical shell, made pair wise with a set of independent segment cylinders with free pistons (2) in which there is the independent gas under pressure. In collectors (1) and cylinders (2) the independent working gas accomplishes a set of simultaneous, successively repeating, thermodynamic cycles (Figures 1 and 2), which states are determined by the position with respect to the heat source or cooled space, where the isothermal expansion and compression are predominant. Simultaneously, at shorter nonisothermal state changes, the heat self-regenerates at a greatest deal without the additional characteristic assemblies, which substituting function is taken over by the existing elements, so that the number of assemblies is maximally reduced. The relatively slower opposite turning of assembly I (1, 2, 3, 4, 5, 6 and 7) with respect to working assembly 11 (8, 9 and 10) is achieved by a system of coupled mechanical transmitters (7, 10 and 11), enabling the transmitting of the exchanger across the heat source or the cooled space. By introducing the recirculation medium, which via the pistons accepts the pressure work and by means of the system of directed (3) and return channels (4 and 5) converts the hydrodynamic energy of the flow into the actuating of turbine (8) and shaft (9), the continued adjustable catalytic connection between a set of integral expansions and compressions is achieved, accomplishing the isothermal continuity. By means of this type construction the heat is continuously, uniformly and directly converted into the rotational mechanical work in a simplest way, by the intensity as it arrives and at the best effect.

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